

Arch.
Arch. vi.
Building.
T.

The Progress of Natural Ventilation.



3 1761 09429064 0

“Incessant movement of the air is a law of Nature; we have only to allow the air in our cities and dwellings to take share in this constant change, and Ventilation will go on uninterrupted without our care.

“In this country, and indeed in most countries, even comparative quiescence of the air for more than a few hours is scarcely known.

“Air is called ‘still’ when it is really moving 1 or $1\frac{1}{2}$ miles an hour. Advantage therefore can be taken of this aspirating power of the wind to cause a movement of the air up a tube.”

—Dr. PARKES, F.R.S.

“Science proves
that there is
not a moment of time
but when there is a
movement of the air,
and that this move-
ment properly utilised
is sufficient at all
times to change the
air in a building and
secure ventilation.”—
HOUGHTON.

The Progress of Natural Ventilation.

Robert Boyle &
Son, Limited,
64, Holborn Viaduct,
London, and at
Glasgow, Paris,
Berlin & New York.

“We have always maintained that a system of ventilation which could be universally applied must be of such a nature that it cannot get out of order, is independent of any special attention, and is self-acting in every part.”—
Engineering.

The Progress of Natural Ventilation.

(*Building News*, June 28th, 1901.)

I.

"It is essential to the success of a natural system of ventilation that both the outlet and inlet ventilators be of correct construction and skilfully applied. Where this is not observed failure generally ensues with this form of ventilation."—

DE CHAUMONT.

“IT is an encouraging sign of the world-wide interest that is now being taken in all questions of hygiene, the increasing adoption of improved sanitary arrangements in countries where not so very long ago they were hardly known even by name, and then only to the few who took an interest in such matters. In Russia, for instance, such a thing as a natural system of ventilation applied in scientific form was until quite recently practically unknown; but the people of that country are now rapidly advancing in the acquisition of a knowledge of the benefits to be derived from having fresh, pure air in their homes and halls, and in the practical application of that knowledge.

“There are, of course, greater difficulties to be contended with in the employment of any

system of ventilation in a country having the climate of Russia than are to be met with in this country with its more equable and temperate climate. In Odessa, the capital city of South Russia; the temperature varies from about 110° Fahr. in summer to 20° Fahr. below zero in winter, when most buildings, particularly dwelling-houses, are usually hermetically sealed up to keep the cold air out and the hot air in, rendering the internal atmosphere anything but healthy or comfortable. These unhealthy conditions are now, we are glad to observe, undergoing a gradual but unmistakable change, and the awakening interest in ventilation seems to be already bearing good fruit.

“The Municipality of Odessa are at present erecting a general hospital in that city, which, when completed, will be one of the largest, as it bids fair to be the most salubrious of, hospitals in Russia, or, for the matter of that, in any country, the very latest and most improved hygienic arrangements being used in all parts of the buildings.

“The Odessa Municipality certainly deserve credit for the enlightened and public-spirited manner in which they have introduced these important sanitary reforms for conserving the public health, and it has furnished an example

of thoroughness which might with advantage be followed by many bodies corporate elsewhere when dealing with such matters, which are too often treated in a perfunctory and half-hearted manner.

“As the efficient ventilation of the hospital was—and rightly so—considered to be of the first importance, very special attention was given to the subject, the principal ventilating engineers in Europe being invited to submit plans. There were, we understand, 34 schemes in all sent in, 19 of which were from this country, 4 being American systems.

“All were mechanical with the exception of one, which was a natural system. The decision arrived at in respect to these plans was that a mechanical system should be adopted. It was resolved, however, that before selecting any particular plan from amongst the number submitted, a committee should be appointed, consisting of engineers, architects, and others qualified to judge, to investigate into the merits of the respective systems, as applied to buildings in different countries.

“This committee commenced its labours in Odessa, where several public buildings are

mechanically ventilated. It seems that in none of the buildings inspected was the mechanical system found to be in operation, though of the latest construction, the committee being informed in each case that the ventilation was better and less objectionable without it, and it had therefore been disused.

“The committee paid a visit to this country and made exhaustive investigations into the different systems in use here, including the natural system. Upon the completion of the investigations, the report of the committee was laid before the Municipality of Odessa, who had also received reports from other quarters, the result being that it was unanimously resolved that mechanical ventilation should not be employed, and that the natural system, submitted by Messrs. Robert Boyle and Son, Ltd., of London and Glasgow, be adopted.

II.

"Perfect Ventilation may be obtained without liability to those dangers and difficulties to be met with where a natural system is set aside in favour of exclusively mechanical modes. The expense of mechanical ventilation is unnecessary, for there is sufficient evidence to show that such buildings as asylums, workhouses, and hospitals are best ventilated by natural means, and no architects of great repute or position have of late years relied upon mechanical ventilation."—G. H. BIBBY, F.R.I.B.A.

“AS the Odessa Municipality is evidently a cautious, as well as progressive, body, it was determined, before finally accepting Messrs. Boyle’s plan, to try a modification of it in a smaller hospital which was then being built, for the purpose of ascertaining how it acted under the climatic conditions prevailing in Russia. This was accordingly done, and the experiment seems to have been satisfactory, as Messrs. Boyle received the order to proceed with the ventilation of the large hospital, which they are now executing, a considerable portion of the work being, we understand, already completed. This is, we believe, one of the largest ventilating contracts which Messrs. Robert Boyle and Son have ever undertaken, and it certainly says a good deal for the efficiency of natural ventilation as applied by this firm, that it should have so successfully come through the severe ordeals to which it was sub-

jected in this instance, and in competition with the principal systems which are in use.

“The wisdom of the selection of natural ventilation by the Odessa Municipality would appear to be endorsed by the awards for ventilation at the Paris Exhibition, where the Boyle system gained the highest prize—two gold medals and one silver medal—against a host of competitors. It might indeed almost be called a world competition in ventilation, as all the best known systems in Europe and the United States were represented, and the jury was formed of eminent scientists, engineers, and sanitarians selected from different countries.

“We cannot but accept this as strong evidence of the steady progress and efficiency of natural ventilation, particularly as the same system gained the £50 prize with grand diploma, the only prize offered, at the International Ventilation Competition held in London, when all the best-known systems of the day competed, the jury being composed of scientific and practical experts of the highest standing.

“We understand that the natural system has now been applied by Messrs. Boyle to several public buildings in Odessa, and that plans are at

present being prepared for the ventilation of the cathedral in that city.

“The system is also used by the Russian Government for the ventilation of Government buildings in St. Petersburg and other places, and is employed in the Russian Navy, sixteen warships being now fitted throughout, whilst others are in progress. In this country natural ventilation for ships likewise seems to be making considerable headway, being adopted by the leading steamship companies. H.M. ship *Hardinge*, the large Indian troopship which was completed last November, is fitted throughout with the Boyle system, it being the one selected in competition with mechanical and other systems.

“In a report from a First Sea Lord of the Admiralty the Boyle natural system is highly commended as applied to battleships in the British Navy. It is also used in the principal Continental navies and steamship companies, including the North German Lloyd, Messageries Maritimes, and the Compagnie Générale Transatlantique, the whole of the last-named company's Transatlantic fleet being fitted throughout, including the last two new steamers, *La Lorraine* and *La Savoie*, each registering over 10,000 tons.

“This system was the one selected by Dr. Nansen for the *Fram* on his expedition to the North Pole, and a plan has been prepared, by desire of Commander Scott, for the ventilation of the *Discovery*, the Antarctic exploration ship at present being fitted out at the East India Dock.

“Scientists, sanitarians, and architects—such as Lord Kelvin, Sir Douglas Galton, F.R.S., Sir Benjamin W. Richardson, F.R.S. (first President of the Sanitary Institute), Professor Sir George Aitchison, R.A., Mr. Alfred Waterhouse, R.A., Sir Arthur Blomfield, A.R.A., and others, have testified to the efficacy of natural ventilation as achieved by the Boyle system, and several Royal Commissions on ventilation have also commended it. The fact that this system has now been applied to over 100,000 buildings in this country alone speaks volumes for the efficiency of natural ventilation when correctly applied, and as the system is used in all parts of the world, the total number of buildings in which it is employed must be very large.

III.

"Ventilation is a science, and it requires the study of a lifetime to master properly all its intricacies. The greatest engineering skill is necessary in the arrangement of tubes and the supply of fresh air."—PARKES.

“THE system has the great advantage that it can be easily and cheaply applied to any kind of building, such as churches, schools, halls, hospitals, &c., and there is nothing about it that can get out of order or that requires attention, the “Air-Pump” ventilator being always in effective operation under any and every condition of the weather, even in a dead calm with a dense fog, or in the closest day in summer.

“The late Mr. Robert Boyle, sen., whose name is so well known in connection with his scientific discoveries and philanthropic work, and who died about twenty-five years ago, had always had the idea that a method of ventilation that could be universally employed must be of the simplest and most economical character, and it was, as a co-worker with Professor Faraday, over fifty years ago, that this idea was developed between them, and culminated later on in the system which has made the name of Boyle in connection with ventilation a household word throughout the world, the Messrs. Boyle (father

and son), being practically the founders of the profession of ventilation engineering, which they have raised by their efforts to the dignity of a science.

“The present Mr. Robert Boyle, who has been the moving spirit for the past thirty-five years in the “sanitary crusades,” which were then inaugurated, has visited almost every country in the world, preaching the doctrine of health, inculcating a knowledge of the benefits to be derived from breathing pure air, and demonstrating how this could be secured by all in a very simple manner by utilising the powerful and unceasing forces of nature which were ready to our hand.

“There is probably no one who has a more comprehensive or extended knowledge of the science and practice of ventilation than Mr. Robert Boyle, or who has done more to advance the cause of ventilation, he having devoted the whole of his life to the exclusive study and practical development of the subject; and his numerous sanitary inventions are well known and appreciated both in this country and abroad.

“Perhaps the best index of the success of his work and of the progress of natural ventilation—they being synonymous—is to be found in the

expansion of the business of which he is the head, the works of the company having, we understand, to be added to each year to meet the influx of contracts and orders until they now are, both in London and Glasgow, more than three times the size they were a few years ago, and it is further proposed to erect still larger works to cope with the ever-increasing demand for their health-saving appliances; the latest patented form of the "Air-Pump" ventilator which has double the extracting power of previous forms, being now supplied at a price that brings it within the reach of all, which is a distinct gain to natural ventilation, and should materially help it in its progress."

“ If the inlets and outlets be properly proportioned and open, the ordinary atmospheric pressure will carry on the ventilation quite efficiently, and the whole Hospital will be kept fresh and comfortable by the natural forces alone.

“ Natural Ventilation is certainly much to be preferred to any and every artificial system, whether on the plenum or vacuum principle.”—

Dr. J. W. HAYWARD.

“My experience is that a natural system of Ventilation is, in the long run, the most reliable and satisfactory, provided, of course, that properly constructed Ventilators are employed, and that they are skilfully applied by a competent engineer. I am quite aware that there are many very indifferent Ventilators in existence, and also incompetent persons who style themselves ‘Ventilating Engineers,’ and that Natural Ventilation applied under such auspices might, and probably would, prove a failure.”—HOUGHTON.

“ Whilst the air is in the lungs, it acquires so much heat that it becomes specifically lighter than the surrounding air, and rises above our heads. The heated air which passes upwards should pass away. . . . For the ventilation of rooms exits should be provided for the spent air *near the ceiling*. . . The method of low ventilation (extraction near the floor) should be avoided on various grounds.”—ROYAL COMMISSION ON VENTILATION (Blue Book).

ROBERT BOYLE, INVENTOR AND SANITARIAN.

(*Founder of the Profession of Ventilation Engineering.*)

By LAWRENCE SAUNDERS.

New and Enlarged Edition. Price 6s.

OPINIONS OF THE PRESS.

"ROBERT BOYLE was a *savant*. There was no trace of selfishness in his actions, and in his inventions he was thinking more of the public good than of his own rewards. . . . It is full of interest as an account of a useful and benevolent life, and is also a very complete record of the progress of science in dealing with the difficult subject of ventilation."—*Architect*.

"A tribute of respect to one of the workers in the field of industry, whose efforts live in the form of benefits handed down to subsequent generations."—*Building News*.

"ROBERT BOYLE was the author of many brilliant inventions, the best known of which is the method of ventilating public buildings which by general consent is the most effective that has yet been introduced. His career was an interesting one."—*Academy*.

"A little book with much in it to suggest thoughts. It is a biographical sketch of the two BOYLES, father and son, who have made their names famous by their system of ventilation. More enthusiastic, simple-hearted men it would be hard to find. The history of their lives, their genius, and their inventions is most interesting."—*Life*.

"The record of an earnest, energetic and untiring life; a life governed by high principle and devoted to noble ends. . . . His useful and laborious life needs no eulogy. Self-culture and help to others were his most marked traits. He was foremost in all social and sanitary improvements, and has left a legacy to the world of at least one invention which is of national worth—the 'air-pump' ventilator—that invention which has made the name of BOYLE world-famous. . . . His name may therefore be enrolled, without hesitation, among the benefactors of the human family."—*Sanitary Engineering*.

"A man of indubitable inventive genius, and strong philanthropic zeal."—*Scotsman*.

"BOYLE, the inventor.—From his earliest youth of an inventive turn of mind. . . . As a philanthropist and a lecturer he gained a wide reputation, but it is as an inventor of sanitary appliances that his name will always be most associated. . . . The result being the now famous 'air-pump' ventilator, which is so widely used not only in this but in other countries."—*Liverpool Courier*.

"ROBERT BOYLE bore a distinguished name in science and proved himself worthy of it. He is now best and most widely known through his 'air-pump' ventilator, which has been applied with signal success to many of our public buildings."—*Edinburgh Courier*.

"Had Mr. BOYLE distinguished himself by nothing but the invention of the 'air-pump' ventilator, he would have well deserved to have a memorial of his career placed before the public. . . . The son inherits the ability and character of his father, and is highly esteemed for his scientific attainments, his literary power, and his influential position as the head of a large and important industry."—*British Mail*.

"A sketch—rather too brief—of the lives of ROBERT BOYLE, father and son, who have brought the question of ventilation and sanitation to a science by the discoveries of their inventive genius."—*Christian World*.

"A bright story of true Christian heroism. As we read through these pages of the almost insurmountable difficulties overcome by the BOYLES, father and son; of the good done; the sanitation achieved; the inventions perfected; we see men whose sole aim was to serve God, benefit mankind, and whose example should be held up to all our boys beginning life."—*Christian*.

"An excellently written biography of the eminent inventor and philanthropist, ROBERT BOYLE. . . . The work is practically a biography of the late ROBERT BOYLE and of his son ROBERT, who is still living and carrying on his father's great work as a sanitary engineer. Both are characters such as Samuel Smiles might well apply his genius to describing."—*Hull Express*.

MR. ROBERT BOYLE'S "SANITARY CRUSADES."

2S. EACH, ILLUSTRATED.

A Sanitary Crusade through the Continent of America.

A Sanitary Crusade through the Far East (India, China, Korea, Japan).

A Sanitary Crusade through South Africa.

A Sanitary Crusade through Australasia, Polynesia, Java, Borneo, Sumatra, Malay Peninsula, Siam, Burmah.

A Sanitary Crusade through Europe.

A Sanitary Crusade through North Africa (Morocco, Algeria, Tunis, Tripoli, Egypt, The Soudan).

A Sanitary Crusade through Iceland and The Faroes.

LONDON: ROBERT BOYLE & SON, LTD.,
64, HOLBORN VIADUCT.

AND AT GLASGOW, PARIS, BERLIN, AND NEW YORK.

Printers: SIR JOSEPH CAUSTON & SONS, LIMITED, London.

